Claims

1. A process for continuously regenerating catalyst particles, wherein the deactivated catalyst particles pass downwards in sequence through the first coke-burning zone, second coke-burning zone, oxychlorination zone, and calcination zone, and are contacted, in the first coke-burning zone, with the regeneration gas from the second coke-burning zone, the supplemented dry air and a inert gas; after coke-burning in the first coke-burning zone, said regeneration gas is withdrawn from the regenerator via the first coke-burning zone, and after the recovery system, is recycled to the second coke-burning zone, where it is contacted with the catalyst particles from the first coke-burning zone.

2. The process according to claim 1, wherein said recovery system comprises a drying step.

3. The process according to claim 1, wherein the regeneration gas may pass through the catalyst bed of the second coke-burning zone along the radial direction in a centrifugal or centripetal manner, and then pass through the catalyst bed of the first coke-burning zone along the radial direction in a centrifugal or centripetal manner.

4. The process according to claim 1, wherein the regeneration gas may pass through the catalyst bed of the second coke-burning zone along the radial direction in a centrifugal manner, and then pass through the catalyst bed of the first coke-burning zone along the radial direction in a centrifugal manner.

5. The process according to claim 1, wherein the operating pressure of the regenerator is in the range of 0.3-0.9 MPa.

6. The process according to claim 1, wherein the water content in the regeneration gas entering the second coke-burning zone is 10-200 ppmv.

7. The process according to claim 1, wherein the oxygen content in the regeneration gas at the inlets of the first and second coke-burning zones is in the range of 0.2-1.0 v%.

8. The process according to claim 1, wherein the temperature of the

regeneration gas entering the first coke-burning zone is in the range of 410-480°C.

9. The process according to claim 1, wherein the temperature of the regeneration gas entering the second coke-burning zone is in the range of 480-520°C.

10. A process for continuously regenerating catalyst particles, comprising: passing deactivated catalyst particles from moving-bed reactors downwards in sequence through the first coke-burning zone, second coke-burning zone, oxychlorination zone, and calcination zone by means of gravity; introducing a dry oxygen-containing gas from the bottom of the second coke-burning zone, with the inlet temperature of said gas being in the range of 480-520°C; passing said gas through the catalyst bed of the second coke-burning zone along the radial direction in a centrifugal or centripetal manner to burn off the small amount of coke on said catalyst particles; cooling the regeneration gas from the second coke-burning zone to 410-480°C by adding dry air for supplementing oxygen and adding a dry inert gas, and introducing said regeneration gas into the first coke-burning zone; passing said regeneration gas through the catalyst bed of the first coke-burning zone along the radial direction in a centrifugal or centripetal manner to burn off most of the coke on said catalyst particles; withdrawing said regeneration gas from the regenerator and mixing it with the outlet gas from the oxychlorination zone; subsequently after the recovery system including a drying step, introducing said regeneration gas into the compressor; heating the compressed dry gas to 480-520°C and recycling it to the second coke-burning zone, thus forming a closed circuit; wherein the oxygen content in the regeneration gas at the inlet of each coke-burning zone is in the range of 0.2-1.0 v%, the water content in the regeneration gas entering the second coke-burning zone is in the range of 10-200 ppmv; and the operating pressure in the regenerator is in the range of 0.3-0.9 MPa.

11. The process according to claim 1 or 10, wherein said inner screen of the first coke-burning zone may either be a cylinder with a uniform

diameter, or a tapered cylinder with reduced diameters from the top downwards.

12. The process according to claim 11, wherein the diameter of said inner screen may be gradually reduced linearly from the top down with its minimal diameter being 60-90% of its maximal diameter.

13. The process according to claim 11, wherein the diameter of said inner screen may be reduced at the point of 40-60% from the top of the height of the first coke-burning zone in a straight down manner so that the diameter at the bottom of said inner screen is 60-90% of the diameter at the top of said inner screen.

14. The process according to claim 1 or 10, wherein said inner screen of the second coke-burning zone is a cylinder in shape.